

IV. MODULE IV - GEOLOGIC REPOSITORY DISPOSAL

IV.A. DESIGNATED DISPOSAL UNITS

This Module authorizes the management and disposal of contact-handled (**CH**) transuranic (**TRU**) mixed waste containers in the Underground Hazardous Waste Disposal Units (**Underground HWDUs**) identified herein. Specific facility and process information for the management and disposal of CH TRU mixed waste in the Underground HWDUs is incorporated in Permit Attachment M2 (Geologic Repository).

IV.A.1. Underground Hazardous Waste Disposal Units

The Underground HWDUs are located at the WIPP facility approximately 2150 feet (665 meters) below the ground surface within the Salado formation. An Underground HWDU is a single excavated panel, consisting of seven rooms and two access drifts, designated for disposal of TRU mixed waste containers.

The Permittees may dispose TRU mixed waste in the Underground HWDUs, provided the Permittees comply with the following conditions:

IV.A.1.a. Disposal containers - the Permittees shall dispose TRU mixed waste in containers specified in Permit Condition [IV.C.1](#).

IV.A.1.b. Disposal locations and quantities - the Permittees shall dispose TRU mixed waste containers in seven (7) Underground HWDUs, as specified in Table [IV.A.1](#) below and depicted in Permit Attachment M2, Figure M2-1. The Permittees may dispose quantities of TRU mixed waste containers in these locations not to exceed the maximum capacities specified in Table [IV.A.1](#) below.

Table IV.A.1 - Underground HWDUs			
Description	Area	Maximum Capacity ¹	Container Equivalent ¹
Panel 1	124,150 ft ² (11,533 m ²)	371,000 ft ³ (10,500 m ³)	50,460 55-Gallon Drums
Panel 2	124,150 ft ² (11,533 m ²)	636,000 ft ³ (18,000 m ³)	86,500 55-Gallon Drums
Panel 3	124,150 ft ² (11,533 m ²)	636,000 ft ³ (18,000 m ³)	86,500 55-Gallon Drums
Panel 4	124,150 ft ² (11,533 m ²)	636,000 ft ³ (18,000 m ³)	86,500 55-Gallon Drums
Panel 5	124,150 ft ² (11,533 m ²)	636,000 ft ³ (18,000 m ³)	86,500 55-Gallon Drums
Panel 6	124,150 ft ² (11,533 m ²)	636,000 ft ³ (18,000 m ³)	86,500 55-Gallon Drums
Panel 7	124,150 ft ² (11,533 m ²)	636,000 ft ³ (18,000 m ³)	86,500 55-Gallon Drums
Total	--	4,187,000 ft³ (118,500 m³)	569,460 55-Gallon Drums

¹ "Maximum Capacity" and "Container Equivalent" values have been reduced to actual capacity and container equivalent for closed Underground HWDUs. Total values reflect remaining permitted capacity and container equivalent.

IV.B. PERMITTED AND PROHIBITED WASTE IDENTIFICATION

IV.B.1. Permitted Waste

The Permittees may dispose TRU mixed waste in the Underground HWDUs, provided the Permittees comply with the following conditions:

- IV.B.1.a. Waste analysis plan - the TRU mixed waste shall be characterized to comply with the waste analysis plan specified in Permit Condition II.C.1.
- IV.B.1.b. TSDF Waste acceptance criteria - the TRU mixed waste shall comply with the treatment, storage, and disposal facility (**TSDF**) waste acceptance criteria specified in Permit Condition II.C.3.
- IV.B.1.c. Hazardous waste codes - the TRU mixed waste shall contain only hazardous waste codes specified in Permit Condition II.C.4.

Derived waste may be disposed in the Underground HWDUs as specified in Permit Condition II.C.5.

IV.B.2. Prohibited Waste

- IV.B.2.a. General prohibition - the Permittees shall not dispose any TRU mixed waste that fails to comply with Permit Condition [IV.B.1](#).
- IV.B.2.b. Specific prohibition - after this Permit becomes effective, the Permittees shall not dispose non-mixed TRU waste in any Underground HWDU unless such waste is characterized in accordance with the requirements of the WAP specified in Permit Condition II.C.1. The Permittees shall not dispose TRU mixed waste in any Underground HWDU if the Underground HWDU contains non-mixed TRU waste which was disposed of after this Permit became effective and was not characterized in accordance with the requirements of the WAP.

IV.C. DISPOSAL CONTAINERS

IV.C.1. Acceptable Disposal Containers

The Permittees shall use containers that comply with the requirements for U.S. Department of Transportation shipping container regulations (49 CFR §173 - Shippers - General Requirements for Shipment and Packaging, and 49 CFR §178 - Specifications for Packaging) for disposal of TRU mixed waste at WIPP. The Permittees are prohibited from disposing TRU mixed waste in any container not specified in Permit Attachment M1, Section M1-1b, as set forth below:

- IV.C.1.a. Standard 55-gallon (208-liter) drum - configured as a 7-pack or as an individual unit.
- IV.C.1.b. Standard waste box (SWB) - as an individual unit.
- IV.C.1.c. Ten-drum overpack (TDOP) - as an individual unit.
- IV.C.1.d. 85-gallon (322-liter) drum - configured as a 4-pack or as an individual unit.
- IV.C.1.e. 100 gallon (379-liter) drum - configured as a 3-pack or as an individual unit.

IV.C.2. Condition of Containers

If a container holding TRU mixed waste is not in good condition (e.g., severe rusting, apparent structural defects) or if it begins to leak prior to disposal in an Underground HWDU, the Permittees shall manage the TRU mixed waste containers specified in Permit Condition [IV.C.1](#) as specified in Permit Attachment M1 and in compliance with 20.4.1.500 NMAC (incorporating 40 CFR §264.171).

IV.D. VOLATILE ORGANIC COMPOUND LIMITS

The Permittees shall limit releases to the air of volatile organic compound waste constituents (**VOCs**) as specified by the following conditions, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)):

IV.D.1. Room-Based Limits

The average measured concentration of VOCs in the headspace gas of all containers and the average calculated emission rate of VOCs from the headspace gas of all containers in any single room within an Underground HWDU shall not exceed the limits specified in Table [IV.D.1](#) below:

Table IV.D.1 - VOC Room-Based Limits		
Compound	VOC Room-Based Concentration Limit (PPMV)	VOC Room-Based Emission Rate Limit (mole/room/year)
Carbon Tetrachloride	9625	4250
Chlorobenzene	13000	5500
Chloroform	9930	4860
1,1-Dichloroethene	5490	2800
1,2-Dichloroethane	2400	1160
Methylene Chloride	100000	53650
1,1,2,2-Tetrachloroethane	2960	1300
Toluene	11000	4780
1,1,1-Trichloroethane	33700	14880

There are no maximum concentration or emission rate limits for other VOCs.

IV.D.2. Determination of VOC Room-Based Limits

The Permittees shall confirm the VOC concentration and emission rate limits identified in Permit Condition [IV.D.1](#) using the following procedures.

- IV.D.2.a. VOC Confirmatory Monitoring - the Permittees shall conduct confirmatory monitoring of VOCs as specified in Permit Condition [IV.F.2](#).

IV.D.2.b. WIPP Waste Information System (WWIS) Report - the Secretary shall have the capability of generating a report from the WWIS database, or equivalent, for identifying the average concentrations and total emission rates of the VOCs specified in Table [IV.D.1](#) on a room and panel basis, based upon the actual waste containers disposed, the VOC headspace gas sampling data for those containers, and the filter diffusion characteristics for those containers.

IV.E. DESIGN, CONSTRUCTION, AND OPERATION REQUIREMENTS

The Permittees shall design, construct, and operate the Underground HWDUs as specified by the following conditions and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601):

IV.E.1. Repository Design

The Permittees shall construct each Underground HWDU in conformance with the requirements specified in Permit Attachment M2 and Permit Attachment M3 (Drawing Number 51-W-214-W, "Underground Facilities Typical Disposal Panel").

IV.E.2. Repository Construction

IV.E.2.a. Construction requirements - subject to Permit Condition [IV.E.1](#), the Permittees may excavate the following Underground HWDUs, as depicted in Permit Attachment M2, Figure M2-1, "Repository Horizon", and specified in Section M2-2a(3), "Subsurface Structures (Underground Hazardous Waste Disposal Units (HWDUs))":

- Panel 10 (Disposal area access drift)
- Panel 2
- Panel 9 (Disposal area access drift)
- Panel 3
- Panel 4
- Panel 5
- Panel 6
- Panel 7
- Panel 8

Prior to disposal of TRU mixed waste in a newly constructed Underground HWDU, the Permittees shall comply with the certification requirements specified in Permit Condition I.E.11.

IV.E.2.b. Notification requirements - at least thirty (30) calendar days prior to the projected start date of excavation of each Underground HWDU, the Permittees

shall provide written notification to the Secretary and to the WIPP facility mailing list stating the projected start date of excavation, along with supporting rationale (e.g., projected waste receipt rate, etc.).

Prior to disposal of TRU mixed waste in a newly constructed Underground HWDU, the Permittees shall comply with the certification requirements specified in Permit Condition I.E.11.

IV.E.3. Repository Operation

- IV.E.3.a. Underground traffic flow - the Permittees shall restrict and separate the ventilation and traffic flow areas in the underground TRU mixed waste handling and disposal areas from the ventilation and traffic flow areas for mining and construction equipment as specified in Permit Attachment G (Traffic Patterns), Figure G-4. TRU mixed waste handling and disposal traffic shall use the waste area intake ventilation drift to access the Underground HWDUs. Mining and construction equipment traffic may use either the construction area intake ventilation drift or the exhaust ventilation drift to access the mining and construction areas.
- IV.E.3.b. Ventilation - the Permittees shall maintain a minimum running annual average mine ventilation exhaust rate of 260,000 standard ft³/min and a minimum active room ventilation rate of 35,000 standard ft³/min when workers are present in the room, as specified in Permit Attachment M2, Section M2-2a(3), "Subsurface Structures (Underground Ventilation System Description)" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)).
- IV.E.3.c. Ventilation barriers - the Permittees shall construct ventilation barricades in active Underground HWDUs to prevent the flow of mine ventilation air through full disposal rooms, as specified in Permit Attachment M2, Section M2-2a(3), "Subsurface Structures (Underground Ventilation System Description)" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.601(c)).

IV.F. MAINTENANCE AND MONITORING REQUIREMENTS

The Permittees shall maintain and monitor the Underground HWDUs as specified by the following conditions and as required by 20.4.1.500 NMAC (incorporating 40 CFR §§264.601 and 264.602):

IV.F.1. Geomechanical Monitoring

- IV.F.1.a. Implementation of geomechanical monitoring program - the Permittees shall implement a geomechanical monitoring program in each Underground HWDU as specified in Permit Attachment M2, Section M2-5b(2), "Geomechanical Monitoring" and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602).
- IV.F.1.b. Reporting requirements - the Permittees shall submit to the Secretary an annual report, beginning twelve (12) months after issuance of this Permit, evaluating the geomechanical monitoring program and shall include geomechanical data collected from each Underground HWDU during the previous year, as specified in Permit Attachment M2, Section M2-5b(2), "Geomechanical Monitoring", and shall also include a map showing the current status of HWDU mining.
- IV.F.1.c. Notification of adverse conditions - when evaluation of the geomechanical monitoring system data identifies a trend towards unstable conditions which requires a decision whether to terminate waste disposal activities in any Underground HWDU, the Permittees shall provide the Secretary with the same report provided to the WIPP Operations Manager within five (5) working days of its issuance, as specified in Permit Attachment M2, Section M2-5b(2)(a), "Description of the Geomechanical Monitoring System".

IV.F.2. Air Monitoring

- IV.F.2.a. Implementation of Confirmatory VOC Monitoring Plan - the Permittees shall implement the Confirmatory VOC Monitoring Plan specified in Permit Attachment N (Confirmatory Volatile Organic Compound Monitoring Plan) and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602 and §264.601(c)). The Permittees shall implement this plan within thirty (30) calendar days of issuance of this Permit until the certified closure of all Underground HWDUs.
- IV.F.2.b. Reporting requirements - the Permittees shall submit to the Secretary an annual report, beginning twelve (12) months after issuance of this permit, describing the implementation and presenting the data and analysis of the Confirmatory VOC Monitoring Plan. This report shall also present data from the WWIS as specified in Permit Condition

[IV.D.2.b](#) and correlate this data, using appropriate statistical methods, with data from the Confirmatory VOC Monitoring Plan.

- IV.F.2.c. Notification requirements - the Permittees shall notify the Secretary in writing, within five (5) working days of obtaining validated analytical results, whenever the concentration of any VOC specified in Table [IV.D.1](#) exceeds the concentration of concern specified in Table [IV.F.2.c](#) below.

The Permittees shall notify the Secretary in writing, within five (5) working days of obtaining validated analytical results, whenever the running annual average concentration (calculated after each sampling event) for any VOC specified in Table [IV.D.1](#) exceeds the concentration of concern specified in Table [IV.F.2.c](#) below.

Table IV.F.2.c - VOC Concentrations of Concern		
Compound	Drift E-300 Concentration	
	ug/m3	ppbv
Carbon Tetrachloride	1050	165
Chlorobenzene	1015	220
Chloroform	890	180
1,1-Dichloroethene	410	100
1,2-Dichloroethane	175	45
Methylene Chloride	6700	1930
1,1,2,2-Tetrachloroethane	350	50
Toluene	715	190
1,1,1-Trichloroethane	3200	590

- IV.F.2.d. Remedial action - if the running annual average concentration for a VOC specified in Table [IV.D.1](#) exceeds the concentration of concern specified in Table [IV.F.2.c](#), the Permittees shall cease disposal in the active disposal room and install ventilation barriers as specified in Permit Condition [IV.E.3.c](#).

If the running annual average concentration for a VOC specified in Table [IV.D.1](#) exceeds the concentration of concern specified in Table [IV.F.2.c](#) for six (6) consecutive months, the

Permittees shall close the affected Underground HWDU as specified in Permit Condition [IV.I.1](#).

For any remedial action taken under this Permit Condition, the Permittees shall submit to the Secretary written quarterly status reports, beginning thirty (30) calendar days after the Permittees submit the initial notification in Permit Condition [IV.F.2.c](#) which resulted in the remedial action. The quarterly status report shall analyze the cause of exceedance, describe the implementation and results of the remedial action, and describe measures taken to prevent future exceedances. The Permittees shall submit such reports until the Secretary determines the remedial action has been completed in accordance with all applicable requirements of this Permit.

IV.F.3. Mine Ventilation Rate Monitoring

- IV.F.3.a. Implementation of Mine Ventilation Rate Monitoring Plan - the Permittees shall implement the Mine Ventilation Rate Monitoring Plan specified in Permit Attachment Q (Mine Ventilation Rate Monitoring Plan) and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.602 and §264.601(c)). The Permittees shall implement this plan within thirty (30) calendar days of approval by the Secretary until the certified closure of all Underground HWDUs.
- IV.F.3.b. Reporting requirements - as part of the annual report to the Secretary required under Permit Condition [IV.F.2.b](#), the Permittees shall describe the implementation and present the results of the data and analysis of the Mine Ventilation Rate Monitoring Plan.
- IV.F.3.c. Notification requirements - the Permittees shall calculate the running annual average mine ventilation exhaust rate on a monthly basis. In addition, the Permittees shall evaluate compliance with the minimum active room ventilation rate specified in Permit Condition [IV.E.3.b](#) on a monthly basis. Whenever the evaluation of the mine ventilation monitoring program data identifies that the ventilation rates specified in Permit Condition [IV.E.3.b](#) have not been achieved, the Permittees shall notify the Secretary in writing within five (5) working days.

IV.G. INSPECTION SCHEDULES AND PROCEDURES

The Permittees shall inspect the Underground HWDUs at least weekly, as specified in Permit Attachment D (Inspection Schedule/Procedures, Table D-1), and as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.15). The Permittees shall perform these inspections to detect malfunctions, signs of deterioration, operator errors, discharges, or any other factors which have caused or may cause a release of hazardous wastes or hazardous waste constituents to the environment or which may compromise the ability of any Underground HWDU to comply with the environmental performance standards in 20.4.1.500 NMAC (incorporating 40 CFR §264.601).

IV.H. RECORDKEEPING

IV.H.1. Underground HWDU Location Map

The Permittees shall maintain, in the operating record, a map containing the exact location and dimensions of each Underground HWDU with respect to permanently surveyed benchmarks.

IV.H.2. Disposal Waste Type and Location

The Permittees shall maintain, in the operating record, a record identifying the types and quantities of TRU mixed waste in each Underground HWDU and the disposal location of each container or container assembly (e.g., a 7-pack of standard 55-gallons drums) within each Underground HWDU, using the following fields from the WWIS data dictionary:

1. Panel Number
2. Room Number or Drift Number
3. Row Number
4. Column Number
5. Column Height
6. Container Type Code
7. Container Identification Number
8. Manifest Document Number
9. Disposal Date

The Permittees shall also maintain, in the operating record, a map or diagram depicting the location and quantity of each waste. The map or diagram shall include a cross reference to specific manifest document numbers, if the waste was accompanied by a manifest, as required by 20.4.1.500 NMAC (incorporating 40 CFR §264.73(b)(2)).

IV.H.3. Ventilation Rates

The Permittees shall maintain, in the operating record, a record identifying any non-conformance to the ventilation rates specified in Permit Condition [IV.E.3.b.](#)

IV.I. CLOSURE

IV.I.1. Panel Closure

Upon completion of disposal in an Underground HWDU, the Permittees shall close the Underground HWDU as specified in Permit Attachment I (Closure Plan) and Permit Attachment I1 (Technical Specifications, Panel Closure System, Waste Isolation Pilot Plant).

IV.I.2. Repository Closure

Upon completion of disposal in the repository and closure of all Underground HWDUs, the Permittees shall close the repository as specified in Permit Attachment I and Permit Attachment I2 (Shaft Sealing System Compliance Submittal Design Report).

IV.I.3. Repository Post-Closure

Upon completion of repository closure as specified in Permit Condition [IV.I.2](#), the Permittees shall comply with all post-closure requirements as specified in Permit Module VI, Post-Closure Care.

IV.J. COMPLIANCE SCHEDULE

The Permittees shall provide a Mine Ventilation Rate Monitoring Plan to the Secretary within ninety (90) calendar days of issuance of this Permit.

IV.J.1. Objective

The Mine Ventilation Rate Monitoring Plan shall specify a monitoring program that will result in the collection of data of adequate quantity and quality to allow the Permittees to demonstrate compliance with the ventilation requirements of Permit Condition [IV.E.3.b](#).

IV.J.2. Content of the Mine Ventilation Rate Monitoring Plan

The Mine Ventilation Rate Monitoring Plan shall address the following at a minimum: objectives of the monitoring; design of the monitoring program (including monitoring schedule and monitoring equipment); monitoring procedures; equipment calibration and maintenance; data evaluation, reporting and recordkeeping; and quality assurance.

IV.J.3. Incorporation of Permit Requirements

The Permittees shall incorporate the implementation, reporting and notification requirements of Permit Condition [IV.F.3](#) into the appropriate section(s) of the Mine Ventilation Rate Monitoring Plan.

IV.J.4. Approval of the Plan

After the Permittees submit the Mine Ventilation Rate Monitoring Plan, the Secretary may approve, disapprove, or modify and approve the Mine Ventilation Rate Monitoring Plan in writing.

If the Secretary approves the Mine Ventilation Rate Monitoring Plan, the Secretary will modify the permit in accordance with Permit Condition I.B.1.

In the event of disapproval (in whole or in part) of the Mine Ventilation Rate Monitoring Plan, the Secretary shall specify deficiencies in writing. The Permittees shall correct these deficiencies and submit a modified Mine Ventilation Rate Monitoring Plan within thirty (30) calendar days of such written notification to the Secretary for review.

PERMIT ATTACHMENTS

Permit Attachment D (as modified from WIPP RCRA Part B Permit Application, "Procedures to Prevent Hazards" - Chapter F).

Permit Attachment G (as modified from the WIPP RCRA Part B Permit Application, "Facility Description" - Chapter B).

Permit Attachment I (as modified from WIPP RCRA Part B Permit Application, "Closure Plans, Post-Closure Plans, and Financial Requirements" - Chapter I).

Permit Attachment I1 (as modified from WIPP RCRA Part B Permit Application, "Detailed Design Report for an Operational Phase Panel-Closure System" - Appendix I1).

Permit Attachment I2 (as modified from WIPP RCRA Part B Permit Application, "Waste Isolation Pilot Plant Shaft Sealing system Compliance Submittal Design Report" - Appendix I2, as replaced by Sandia Report SAND 96-1326).

Permit Attachment M1 (as modified from WIPP RCRA Part B Permit Application, "Facility and Process Information" - Chapter D).

Permit Attachment M2 (as modified from WIPP RCRA Part B Permit Application, "Facility and Process Information" - Chapter D).

Permit Attachment M3 (as modified from WIPP RCRA Part B Permit Application, "Underground Facilities Typical Disposal Panel" - Drawing Number 51-W-214-W).

Permit Attachment N (as modified from WIPP RCRA Part B Permit Application, "Confirmatory Volatile Organic Compound Monitoring Plan" - Appendix D20).

Permit Attachment Q ("Mine Ventilation Rate Monitoring Plan").